

CLAIM OR CLAIMS

We claim:

1. A curable thermoplastic elastomeric blend comprising:
 - (a) from 15 to 60 weight percent of a polyalkylene phthalate polyester polymer or copolymer and;
 - (b) from 40 to 85 weight percent of a cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber in combination with an effective amount of peroxide free-radical initiator and an organic diene co-agent to cross-link said rubber during extrusion or injection molding of said curable thermoplastic elastomeric blend.
2. A curable thermoplastic elastomeric blend of Claim 1 wherein said polyalkylene phthalate polyester polymer or copolymer is selected from the group consisting of polyalkylene terephthalate, polyalkylene terephthalate copolymer, polyether ester of polyalkylene terephthalate, and polyether ester of polyalkylene terephthalate copolymer.
3. A curable thermoplastic elastomeric blend of Claim 1 or 2 wherein said rubber is selected from the group consisting of polyacrylate elastomer, and polyethylene/acrylate elastomer.
4. A curable thermoplastic elastomeric blend of Claim 3 wherein said organic diene co-agent is selected from the group consisting of diethylene glycol diacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, polyethylene glycol dimethacrylate, N,N'-m-phenylene dimaleimide, and triallylisocyanurate.
5. A curable thermoplastic elastomeric blend of Claim 4 wherein said free radical initiator is selected from the group consisting of 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane, and t-butyl peroxybenzoate.
6. A curable thermoplastic elastomeric blend of Claim 1 wherein said polyalkylene phthalate polyester polymer or copolymer is a block copolymer of segments of polybutylene terephthalate and segments of poly(tetramethylene ether) glycol, said rubber is an ethylene/methylacrylate copolymer elastomer, said peroxide free-radical

initiator is 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3 and said organic diene co-agent is diethylene glycol dimethacrylate.

7. A melt processible thermoplastic elastomeric composition comprising:
 - (a) from 15 to 60 weight percent of a polyalkylene phthalate polyester polymer or copolymer continuous phase and;
 - (b) from 40 to 85 weight percent of a poly(meth)acrylate or polyethylene/(meth)acrylate rubber disperse phase wherein said rubber is dynamically cross-linked with a peroxide free-radical initiator and an organic diene co-agent.
8. A melt processible thermoplastic elastomeric composition of Claim 7 wherein said polyalkylene phthalate polyester polymer or copolymer is selected from the group consisting of polyalkylene terephthalate, polyalkylene terephthalate copolymer, polyether ester of polyalkylene terephthalate, and polyether ester of polyalkylene terephthalate copolymer.
9. A melt processible thermoplastic elastomeric composition of Claim 7 or 8 wherein said poly(meth)acrylate or polyethylene/(meth)acrylate rubber is selected from the group consisting of polyacrylate elastomer, and polyethylene/acrylate elastomer.
10. A melt processible thermoplastic elastomeric composition of Claim 9 wherein said organic diene co-agent is selected from the group consisting of diethylene glycol diacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, polyethylene glycol dimethacrylate, N,N'-m-phenylene dimaleimide, and triallylisocyanurate.
11. A melt processible thermoplastic elastomeric composition of Claim 10 wherein said free radical initiator is selected from the group consisting of 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane, and t-butyl peroxybenzoate.
12. A melt processible thermoplastic elastomeric composition of Claim 6 wherein said polyalkylene phthalate polyester polymer or copolymer is a block copolymer of segments of polybutylene terephthalate and segments of poly(tetramethylene ether) glycol, said rubber is an ethylene/methylacrylate copolymer elastomer, said peroxide free-radical

initiator is 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3 and said organic diene co-agent is diethylene glycol dimethacrylate.

13. A melt processible thermoplastic elastomeric composition of Claim 7 wherein the compression set at 100°C and 22 hours is ≤ 46 .

14. A melt processible thermoplastic elastomeric composition of Claim 7 wherein the Shore A hardness is ≥ 59 .

15. A curable thermoplastic elastomeric blend of Claim 1 wherein the cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber in combination with an effective amount of peroxide free-radical initiator and an organic diene co-agent to cross-link said rubber is characterized by a time at maximum G' rate of ≥ 3.9 minutes when determined using an Alpha Technologies Advanced Polymer Analyzer APA 2000, parallel plate die, 2.583 mm die gap, 100.0 cpm frequency, 0.500 deg strain, at 180°C.

16. A process for manufacture of a melt processible thermoplastic elastomeric composition comprising the steps of:

- (a) adding and admixing a cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber, a peroxide free-radical initiator and an organic diene co-agent in a melt extruder or melt blender at a temperature insufficient to promote cross-linking;
- (b) adding a polyalkylene phthalate polyester polymer to said melt extruder or melt blender and admixing said polyalkylene phthalate polyester polymer with said cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber prior to cross-linking;
- (c) further mixing said cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber with peroxide free-radical initiator and an organic diene co-agent with said polyalkylene phthalate polyester polymer at conditions and temperature sufficient to cross-link said cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber; and

(d) recovering a melt processible thermoplastic elastomeric composition comprising from 15 to 60 weight percent of said polyalkylene phthalate polyester polymer or copolymer as a continuous phase and from 40 to 85 weight percent of said poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber cross-linked with said peroxide free-radical initiator and said organic diene co-agent as a disperse phase.

17. A process of Claim 16 wherein said polyalkylene phthalate polyester polymer or copolymer is selected from the group consisting of polyalkylene terephthalate, polyalkylene terephthalate copolymer, polyether ester of polyalkylene terephthalate, and polyether ester of polyalkylene terephthalate copolymer.
18. A process of Claim 16 or 17 wherein said rubber is selected from the group consisting of polyacrylate elastomer, polyethylene/acrylate elastomer and polyperfluoroalkylacrylate elastomer.
19. A process of Claim 18 wherein said organic diene co-agent is selected from the group consisting of diethylene glycol diacrylate, diethylene glycol dimethacrylate, N,N'-m-phenylene dimaleimide, and triallylisocyanurate.
20. A process of Claim 19 wherein said free radical initiator is selected from the group consisting of 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane, and t-butyl peroxybenzoate.
21. A process of Claim 19 wherein said polyalkylene phthalate polyester polymer is a block copolymer of segments of polybutylene terephthalate and segments of poly(tetramethylene ether) glycol, said rubber is an ethylene/methylacrylate copolymer elastomer, said peroxide free-radical initiator is 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3 and said organic diene co-agent is diethylene glycol dimethacrylate.
22. A process of Claim 16 wherein admixing of said cross-linkable poly(meth)acrylate or polyethylene/(meth)acrylate vulcanizate rubber, said free-radical initiator and said organic diene co-agent is characterized by a time at maximum G' rate of ≥ 3.9 minutes when determined using an Alpha

Technologies Advanced Polymer Analyzer APA 2000, parallel plate die, 2.583 mm die gap, 100.0 cpm frequency, 0.500 deg strain, at 180°C.

23. A shaped or molded article made from a melt processible thermoplastic elastomeric composition comprising:
- (a) from 15 to 60 weight percent of a polyalkylene phthalate polyester polymer or copolymer continuous phase and;
 - (b) from 40 to 85 weight percent of poly(meth)acrylate or polyethylene/(meth)acrylate rubber disperse phase wherein said rubber is cross-linked with a peroxide free-radical initiator and an organic diene co-agent.
24. A shaped or molded article of Claim 23 wherein said polyalkylene phthalate polyester polymer or copolymer is selected from the group consisting of polyalkylene terephthalate, polyalkylene terephthalate copolymer, polyether ester of polyalkylene terephthalate, and polyether ester of polyalkylene terephthalate copolymer.
25. A shaped or molded article of Claim 23 or 24 wherein said rubber is selected from the group consisting of polyacrylate elastomer, and polyethylene/acrylate elastomer.
26. A shaped or molded article of Claim 25 wherein said organic diene co-agent is selected from the group consisting of diethylene glycol diacrylate, diethylene glycol dimethacrylate, N,N'-m-phenylene dimaleimide, and triallylisocyanurate.
27. A shaped or molded article of Claim 26 wherein said free radical initiator is selected from the group consisting of 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane, and t-butyl peroxybenzoate.
28. A shaped or molded article of Claim 23 wherein said polyalkylene phthalate polyester polymer or copolymer is a block copolymer of segments of polybutylene terephthalate and segments of poly(tetramethylene ether) glycol, said rubber is an ethylene/methylacrylate copolymer elastomer, said peroxide free-radical initiator is 2,5-dimethyl-2,5-di-(t-butylperoxy) hexyne-3 and said organic diene co-agent is diethylene glycol dimethacrylate.